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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Peter Seitz

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HOUSTON ELISEEVA
4 MILITIA DRIVE, SUITE 4
LEXINGTON, MA 02421

EXAMINER

RODELA, EDUARDO A

ART UNIT

PAPER NUMBER

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/518,963	Applicant(s) SEITZ, PETER	
	Examiner EDUARDO A. RODELA	Art Unit 2826	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 March 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-38 is/are pending in the application.
- 4a) Of the above claim(s) 11, 12 and 14 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 19-22 and 25-28 is/are allowed.
- 6) ☒ Claim(s) 1, 2, 6-10, 13, 15-18, 23, 24, 29, 30 and 35-38 is/are rejected.
- 7) ☒ Claim(s) 3-5 and 31-34 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 December 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|----------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>4/29/2008</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This Office Action is in response to the communications received March 11, 2008.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 2, 6, 7, 15-18, 29, 30 and 35, are rejected under 35 U.S.C. 102(b) as being anticipated by Komiya et al. (3,714,522).

Regarding Claims 1 and 29, Komiya shows in Figures 2 and 9a-b, an image sensor element comprising:

a semiconductor substrate [8],

a radiation transparent insulating layer [4] formed on the semiconductor substrate [8],

an electrode [3] formed as a layer of transparent resistive material on the insulating layer [4], the transparent resistive material [3] extending across a photosensitive part [area between 5 and 6] of the image sensor element in which incident light is converted into photo generated charges,

a first contact [metal terminal connected to 5] adjacent to one edge of the resistive layer [3],

a first diffusion [5] region in the semiconductor substrate [8] of opposite conductivity [n-type] to the semiconductor substrate [8, p-type] located adjacent [next to] to the first contact [metal terminal connected to 5] and biased to a higher potential than that of the first contact,

a second contact [7] adjacent to a second edge [right most edge of 3], opposite the first edge [left most edge of 3], of the resistive layer [3],

a second diffusion region [6] is the semiconductor substrate [8] of opposite conductivity [n-type] to the semiconductor substrate [p-type] located adjacent to the second contact [7] and biased to a higher potential is at a higher potential energy than that of the second contact, means for applying an electrical potential between the first and second contacts [contacts shown], and means for reading out the charge on the first and/or second diffusion regions [contacts shown].

It is noted that the claim language, "biased to a higher potential than that of the first contact" does not distinguish over the prior art, because a recitation of the intended use of the claimed invention must result in a **structural difference** between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim.

Regarding Claim 2, shows wherein the resistive layer [3] is rectangular [shown].

Regarding Claims 6, Komiya shows in which two contacts are arranged on each of two opposite sides [shown].

Regarding Claims 7, 30, and 35, Komiya shows in which the resistive layer is square [shown to be a square shape in Figure 12(a)].

Regarding claim 15, Komiya shows a device for the detection and demodulation of a modulated wavefield comprising an image sensor consisting of a one or two dimensional array of image sensor elements, each image sensor element being an image sensor element as claimed in claim 1:

a signal generator for supplying time dependent voltage patterns to the contacts on each of the image sensor element electrodes in synchronism with the modulation frequency of the incident wavefield to transport photocharges laterally to the corresponding diffusions on which photocharges are accumulated [column 9, lines 9-22]; and

readout means for reading out the charges on the diffusions for use in calculating the modulation parameters of the incident modulated wavefield [column 9, lines 9-22],

a semiconductor substrate [8],

a radiation transparent insulating layer [4] formed on the semiconductor substrate [8],

an electrode [3] formed as a layer of transparent resistive material on the insulating layer [4], the transparent resistive material [3] extending across a photosensitive part [area between 5 and 6] of the image sensor element in which incident light is converted into photo generated charges,

a first contact [metal terminal connected to 5] adjacent to one edge of the resistive layer [3],

a first diffusion [5] region in the semiconductor substrate [8] of opposite conductivity [n-type] to the semiconductor substrate [8, p-type] located adjacent [next to] to the first contact [metal terminal connected to 5] and biased to a higher potential than that of the first contact,

a second contact [7] adjacent to a second edge [right most edge of 3], opposite the first edge [left most edge of 3], of the resistive layer [3],

a second diffusion region [6] is the semiconductor substrate [8] of opposite conductivity [n-type] to the semiconductor substrate [p-type] located adjacent to the second contact [7] and biased to a higher potential is at a higher potential energy than that of the second contact, means for applying an electrical potential between the first and second contacts [contacts shown], and means for reading out the charge on the first and/or second diffusion regions [contacts shown].

It is noted that the claim language, "biased to a higher potential than that of the first contact" does not distinguish over the prior art, because a recitation of the intended use of the claimed invention must result in a **structural difference** between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim.

Regarding claims 16-17, contain functional language that do not impart patentably distinct content since they are drawn to a method of operation, and the current claims are dependent upon a structural claim.

Regarding claim 18, Komiya shows the device as claimed in claim 15. In addition, Komiya shows comprising an evaluation unit for calculating the modulation parameters of the incident wavefield from the charges readout from the diffusions [column 8, lines 56-67].

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 8, 9, 23, 24, 36 and 37, are rejected under 35 U.S.C. 103(a) as being unpatentable over Komiya et al. (3,714,522).

Regarding Claim 8, 23 and 36, Komiya does not specify in which the insulating layer is between 1nm and 1um thick. However, it is well known in the art to provide oxide insulators of a thickness within 1nm and 1um, see last paragraph of page 513 of Microchip Fabrication (2000) by Peter Van Zant. It is known in the art that having an insulating layer is between 1nm and 1um is beneficial because they provide for faster devices and lower threshold voltages. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used an insulating layer of 1nm to 1um in the invention of Komiya as it is known in the art, to provide for a faster device with a lower threshold voltage.

Regarding Claims 9, 24 and 37, Komiya does not specify in which the electrode has a sheet resistivity of greater than 10 Ohms per square. However, as it is pointed

out in the specification of the applicant, a material which is capable of providing such a sheet resistivity is doped polysilicon. It is well known in the art to provide electrodes made of doped polysilicon (electrode has a sheet resistivity of greater than 10 Ohms per square), see last paragraph of page 404 of Microchip Fabrication (2000) by Peter Van Zant. It is known in the art that having electrodes made of doped polysilicon (electrode has a sheet resistivity of greater than 10 Ohms per square) is beneficial because they provide for good ohmic contacts. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used an electrodes made of doped polysilicon (electrode has a sheet resistivity of greater than 10 Ohms per square) in the invention of Komiya as it is known in the art, to provide for a good ohmic contact.

Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Komiya et al. (3,714,522) in view of Meynants (US 7,268,815).

Regarding claim 13, Komiya shows the image sensor element as claimed in claim 1. Komiya does not show wherein the read out means is implemented as a transconductance amplifier, for measuring the photocurrent at the first or second diffusion regions, with a pixel select transistor. Meynants shows wherein the read out means is implemented as a transconductance amplifier, for measuring the photocurrent at the first or second diffusion regions, with a pixel select transistor [column 10, lines 41-50]. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used a wherein the read out means is implemented as a transconductance amplifier, for measuring the photocurrent at the first or second

diffusion regions, with a pixel select transistor as suggested by Meynants in the invention of Komiya for the purpose of providing a device which can perform the function of reading out the accumulated charge signals.

Claims 10 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Komiya et al. (3,714,522) in view of Maloney (US 6,323,985).

Regarding claims 10 and 38, Komiya does show in which the photosensitive part of the element is implemented in a semiconducting layer ["half conducting", column 3, lines 50-51] at the surface of the substrate [8].

Komiya does not show the surface semiconducting layer being of opposite conductivity to the substrate, the element further comprising means for biasing the surface semiconducting layer so that it is fully depleted.

Maloney does show in Figure 2, wherein the surface semiconducting layer [204] being of opposite conductivity [p-type] to the substrate [n-type, 220], the element further comprising means for biasing the surface semiconducting layer so that it is fully depleted.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used a semiconducting layer being of opposite conductivity to the substrate in the invention of Komiya as suggested by Maloney, for the purpose of providing a material which is capable of providing further control over the gate terminal, while being less resistive and therefore requiring less power consumption.

Allowable Subject Matter

Claims 3-5 and 31-34 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The prior art does not show wherein there are more than two contacts over a resistive material which is over an insulation layer.

Claims 19-22 and 25-28 are allowed. The prior art fails to disclose the particular method of operating the photosensitive device.

Response to Arguments

Applicant's arguments with respect to the claims have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Fax / Telephone Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eduardo A. Rodela whose telephone number is (571) 272-8797. The examiner can normally be reached on M-F, 9:00AM-5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sue Purvis can be reached on (571) 272-1236. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Eduardo A Rodela /EAR/
Examiner
Art Unit 2826

/Sue A Purvis/

Supervisory Patent Examiner, Art Unit 2826